Machine Generated English Translation Of JP08277486

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the plating equipment of a leadframe which galvanizes by injecting plating liquid to a leadframe.
[0002]
[Description of the Prior Art] As plating equipment of a leadframe, the plating equipment shown in drawing 4 is known from the former. As shown in drawing 4 , this plating equipment is equipped with the press block 1 which pinches a leadframe 2 between the fixture 4 for masks which has bore 4a, and this fixture 4 for masks, and mask rubber 3 is attached in the top face of the fixture 4 for masks.
[0003] The fixture 4 for masks is installed in upper limit opening of the outside tub 15, and the injection tank 6 by which the injection nozzle 5 was attached is arranged in the outside [this] tub 15.
[0004] Moreover, outside the outside tub 15, the plating liquid tank 10 in which plating liquid is stored is arranged by the way, and this plating liquid tank 10 and the injection tank 6 are connected with it by the supply line 21 in which the feeding pump 9 was attached. Furthermore, the pars basilaris ossis occipitalis and the plating liquid tank 10 of the outside tub 15 are connected by the return line 22.
[0005] Moreover, into the plating liquid tank 10, the internal organs of a heater 18 and the thermocouple 19 are carried out, and based on the signal from a thermocouple 19, a thermoregulator 20 performs ON OFF of a heater 18, and is maintaining the temperature in the plating liquid tank 10 at about 50 degrees C - 60 degrees C.
[0006] In the plating equipment of such a leadframe, the plating liquid in the plating liquid tank 10 is supplied through a supply line 21 in the injection tank 6 with the feeding pump 9. Furthermore, the plating liquid in the injection tank 6 is injected from an injection nozzle 5 to a leadframe 3 through bore 4a of the fixture 4 for masks. In this case, it energizes to this leadframe 3 by using a leadframe 3 as cathode, and plating is performed to a leadframe 3.
[0007] The plating liquid injected by the leadframe 3 collects in the tub 15 outside after that, and is returned in the plating liquid tank 10 through a return line 22 from the pars basilaris ossis occipitalis of the outside tub 15.
[0008]
[Problem(s) to be Solved by the Invention] Plating liquid is heated and maintained to about 60 degrees C within the plating liquid tank 10 as mentioned above. By the way, if the plating liquid injected to a leadframe 3 is heated, since a current will become easy to flow the inside of plating liquid, higher current density can be applied.
[0009] However, the plating liquid tank 10, the supply line 21, and the return-line 22 grade serve as a general comparatively cheap product made from heat-resistant vinyl chloride, and, for this reason, it is difficult for them to heat 60 degrees C or more of plating liquid in the plating liquid tank 10, for example.
[0010] It aims at offering the plating equipment of the leadframe which can inject hot plating liquid to a leadframe, without making this invention in consideration of such a point, and making the plating liquid in the plating liquid tank 10 into an elevated temperature.

[0011]
[Means for Solving the Problem] The press block whose this invention pinches a leadframe between the fixture for masks which has a bore, and this fixture for masks, The injection nozzle which is arranged near the bore of the fixture for masks and injects plating liquid to a leadframe through a bore, The plating liquid tank in which it connects with this injection nozzle through a supply line, and plating liquid is stored, It is plating equipment of the leadframe characterized by having had the return line to which even a plating liquid tank returns the plating liquid injected to the leadframe, and attaching the heater for plating liquid heating said injection nozzle or near [its] the upstream.
[0012]
[Function] According to this invention, a leadframe is pinched between the fixture for masks, and a press block. The plating liquid in a plating liquid tank is sent to an injection nozzle through a supply line, and after plating liquid is heated at a heater [an injection nozzle or near / its / the upstream], it is injected from an injection nozzle to a leadframe through the bore of the fixture for masks. The plating liquid injected to the leadframe is returned from a return line even to a plating bath.
[0013]
[Example] Hereafter, the example of this invention is explained with reference to a drawing. Drawing 1 is drawing showing the 1st example of the plating equipment of the leadframe by this invention.
[0014] In the example shown in drawing 1 , the same sign is given to the same part as the part shown in drawing 4 , and detailed explanation is omitted. That is, as shown in drawing 1 , plating equipment is equipped with the press block 1 which pinches a leadframe 2 between the fixture 4 for masks which has bore 4a, and this fixture 4 for masks, and mask rubber 3 is attached in the top face of the fixture 4 for masks.
[0015] The fixture 4 for masks is installed in upper limit opening of the outside tub 15, and the injection tank 6 by which the injection nozzle 5 was attached is arranged in the outside [this] tub 15.
[0016] Moreover, outside the outside tub 15, the plating liquid tank 10 in which plating liquid is stored is arranged by the way, and this plating liquid tank 10 and the injection tank 6 are connected with it by the supply line 21 in which the feeding pump 9 was attached. Furthermore, the pars basilaris ossis occipitalis and the plating liquid tank 10 of the outside tub 15 are connected by the return line 22.
[0017] Moreover, a heater 18 and a thermocouple 19 are built in in the plating liquid tank 10, and based on the signal from a thermocouple 19, a thermoregulator 20 performs ON OFF of a heater 18, and is maintaining the temperature in the plating liquid tank 10 at about 30 degrees - 50 degrees C.
[0018] Moreover, as shown in drawing 1 , the plating liquid sent to an injection nozzle 5 side from the injection tank 6 is further heated in the injection tank 6 side end face section of each injection nozzle 5, and the heater 11 which makes whenever [plating solution temperature] 70 degrees C - 90 degrees C is attached in it. Furthermore, the plating liquid in a return line 22 is prepared in the cooling system 25 for cooling to 30 degrees C - 50 degrees C by the return line 22 from the tub 15 outside a sparger to the plating liquid tank 10. In addition, a heater 11 may be formed (the tank near [6] the upstream (for example, an injection tank) of an injection nozzle 5).
[0019] Next, the quality of the material of each part is explained. The outside tub 15, the injection tank 6, and an injection nozzle 5 consist of a glass epoxy resin or a ceramic, and the plating bath 10, the supply line 21, and the return line 22 consist of heat-resistant vinyl chloride or usual vinyl chloride.
[0020] Next, the operation of this example which consists of such a configuration is explained. In drawing 1 , a leadframe 2 is laid on the mask rubber 3 of the fixture 4 for masks, the press block 1 descends to this leadframe 2, and a leadframe 2 is pinched between the fixture 4 for masks, and the press block 1. Next, the plating liquid stored at the temperature of 30 degrees C - 50 degrees C in the plating liquid tank 10 is supplied to the injection tank 6 through a supply line 21 with the feeding pump 9. Plating liquid is further injected from the injection tank 6 through an injection nozzle 5 to bore 4a of the fixture 4 for masks to the leadframe 2. In this case, plating liquid is heated to 70 degrees C - 90 degrees C at a heater 11, and energization is performed to coincidence by using a leadframe 2 as cathode to a leadframe 2.

[0021] Thus, by energizing to a leadframe 2, plating is performed to a leadframe 2. In this case, since the temperature of the plating liquid injected from an injection nozzle 5 can be heated to 70 degrees C - 90 degrees C, the current density of plating liquid can be raised and the same thickness can be galvanized more to a leadframe 2 in a short time.
[0022] The plating liquid injected by the leadframe 2 descends by self-weight to the pars basilaris ossis occipitalis of the outside tub 15 after that, and plating liquid returns from the pars basilaris ossis occipitalis of the outside tub 15 in the plating liquid tank 10 through a return line 22. Plating liquid is cooled to 30 degrees C - 50 degrees C by the cooling system 25 of a return line 22 in the meantime. Thus, since the plating liquid cooled by the cooling system 25 is returned in the plating liquid tank 10, the temperature of plating liquid can be kept at 30 degrees C - 50 degrees C in the plating liquid tank 10.
[0023] While being able to inject [as mentioned above] the plating liquid heated to the elevated temperature from an injection nozzle 5 to a leadframe 2 to 70 degrees C - 90 degrees C at a heater 11 according to this example, it can cool with a cooling system 25 and the plating liquid from a leadframe 2 can be returned in the plating liquid tank 10. For this reason, the current density of the plating liquid injected to a leadframe 2 can be raised, and the same thickness can be galvanized more to a leadframe 2 in a short time. Moreover, since plating liquid can be maintained at 30 degrees C - 50 degrees C and can be stored in the plating liquid tank 10, it is not necessary to produce the plating liquid tank 10, a supply line 21, and a return line 22 with a heat-resistant ingredient especially.
[0024] Next, drawing 2 explains the 2nd example of this invention. As shown in drawing 2 , while the 2nd example forms the wrap enclosure section 7 for each injection nozzle 5 in the fixture 4 for masks instead of preparing an outside tub, a vacuum pump 18 is formed in a return line 22, and others are the 1st example and abbreviation identitas which are shown in drawing 1 .
[0025] That is, as shown in drawing 2 , each injection nozzle 5 is formed in the wrap enclosure section 7 by the lower part of the fixture 4 for masks, and this enclosure section 7 is open for free passage to free passage object 7a supported at the injection tank 6. Moreover, free passage object 7a is connected to the plating liquid tank 10 through a return line 22, and the vacuum pump (suction pump) 18 is further attached in the return line 22.
[0026] Next, the operation of this example which consists of such a configuration is explained. As shown in drawing 2 , after even the injection tank 6 attains the plating liquid kept at 30 degrees C - 50 degrees C within the plating liquid tank 10 with the feeding pump 9 and being heated to 70 degrees C - 90 degrees C at a heater 11, it is injected to a leadframe 2 through an injection nozzle 5. The plating liquid injected by the leadframe 2 reaches free passage object 7a through the inside of the enclosure section 7 after that, and is returned to the plating liquid tank 10 through a return line 22 after that. In the meantime, in a return line 22, it is cooled to 30 degrees C - 50 degrees C by the cooling system 25, and plating liquid is attracted by the vacuum pump 18, and is returned to the plating liquid tank 10.
[0027] Although it becomes easy to attach plating to the part when plating liquid leaks from a fixture since it becomes easier to attach plating when plating liquid is elevated-temperature-ized Since the interior of a fixture serves as negative pressure by enclosing the plating liquid injected from the injection nozzle 5 to the leadframe 2 with a vacuum pump 18, and sucking it out through the section 7 and free passage object 7a according to this example, It is a pile to a lifting about plating liquid being unable to leak easily outside and plating sticking in addition to the part which should therefore be galvanized. Moreover, by sucking out plating liquid compulsorily, the flow of the plating liquid in the part which should galvanize a leadframe becomes early, and improvement in the speed of plating can be attained more by the synergistic effect with the formation of a plating liquid elevated temperature.
[0028] Next, drawing 3 explains the 3rd example of this invention. As shown in drawing 3 , instead of the 3rd example forming a vacuum pump, an aspirator 26 is formed in a return line 22, and others are the 2nd example and abbreviation identitas which are shown in drawing 2 .
[0029] Namely, as shown in drawing 3 , a return line 22 is connected to free passage object 7a, and the aspirator 26 is formed at the tip of this return line 22. Moreover, the circulation line 28 in which the feeding pump 27 was attached is connected to the plating liquid tank 10. This circulation line 28 extends to an aspirator 26 from the plating liquid tank 10, and the circulation line 28 is further

connected to the plating liquid tank 10.
[0030] Next, the operation of this example which consists of such a configuration is explained. As shown in drawing 3 , after even the injection tank 6 attains the plating liquid kept at 30 degrees C - 50 degrees C within the plating liquid tank 10 with the feeding pump 9 and being heated to 70 degrees C - 90 degrees C at a heater 11, it is injected to a leadframe 2 through an injection nozzle 5.
[0031] The plating liquid injected by the leadframe 2 reaches free passage object 7a through the inside of the enclosure section 7 after that, and is returned to the plating liquid tank 10 through the back track Rhine 22. In the meantime, the plating liquid in the plating liquid tank 10 circulates through the inside of a circulation line 28 with the feeding pump 27. And if low-temperature plating liquid passes through the inside of an aspirator 26 comparatively from the feeding pump 27, by this aspirator 26, the comparatively hot plating liquid in free passage object 7a will be sucked out, and the plating liquid of comparatively the elevated temperature of low-temperature plating liquid and free passage object 7a comparatively from the feeding pump 27 will be mixed in an aspirator 26. Thus, an aspirator 26 achieves two functions, suction of the plating liquid from free passage object 7a, and the plating liquid from free passage object 7a, of cooling.
[0032]
[Effect of the Invention] Since it can inject to a leadframe through the bore of the fixture for masks according to this invention after heating plating liquid by the injection nozzle as explained above, current density can be raised by the ability making into an elevated temperature the plating liquid injected by the leadframe, and it can galvanize more to a leadframe in a short time. Since plating liquid can be comparatively supplied at low temperature to an injection nozzle, it becomes unnecessary moreover, to produce a plating liquid tank and a supply line with heat-resisting material.

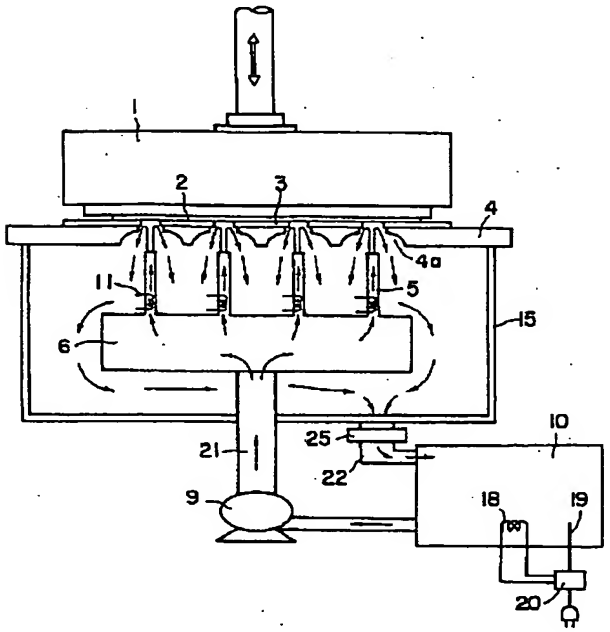
[Translation done.]

CLAIMS

[Claim(s)]
[Claim 1] Plating equipment of a leadframe which is equipped with the following and characterized by attaching the heater for plating liquid heating said injection nozzle or near [its] the upstream. The fixture for masks which has a bore The press block which pinches a leadframe between this fixture for masks The injection nozzle which is arranged near the bore of the fixture for masks and injects plating liquid to a leadframe through a bore The return line to which even a plating liquid tank returns the plating liquid tank in which it connects with this injection nozzle through a supply line, and plating liquid is stored, and the plating liquid injected to the leadframe
[Claim 2] Plating equipment of the leadframe according to claim 1 characterized by the thing for which each injection nozzle was connected to the fixture for masks with the wrap in the state of sealing at the return line, and which enclosed, prepared the section and attached the suction pump in said return line.

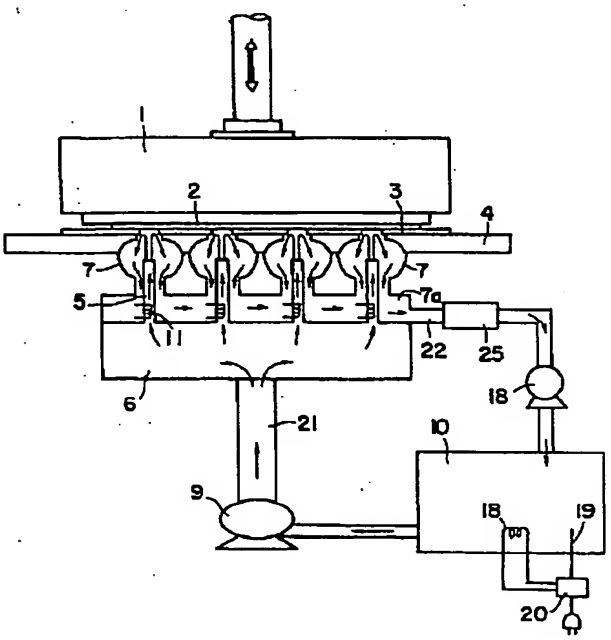
[Translation done.]

Drawing selection drawing 1



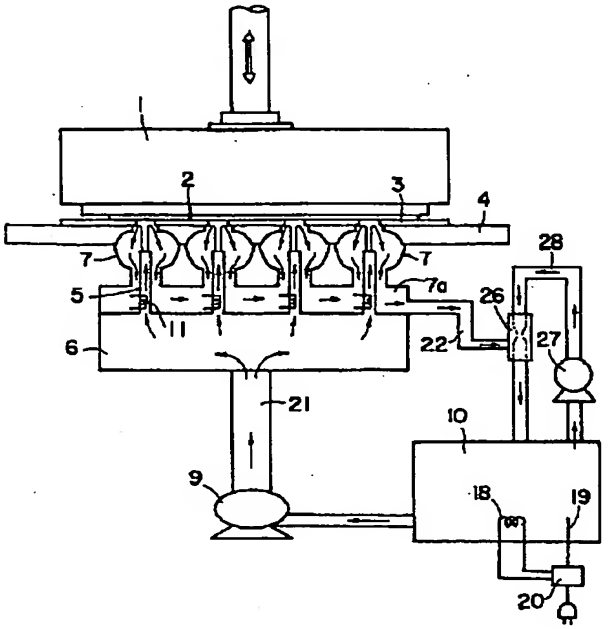
[Translation done.]

Drawing selection drawing 2



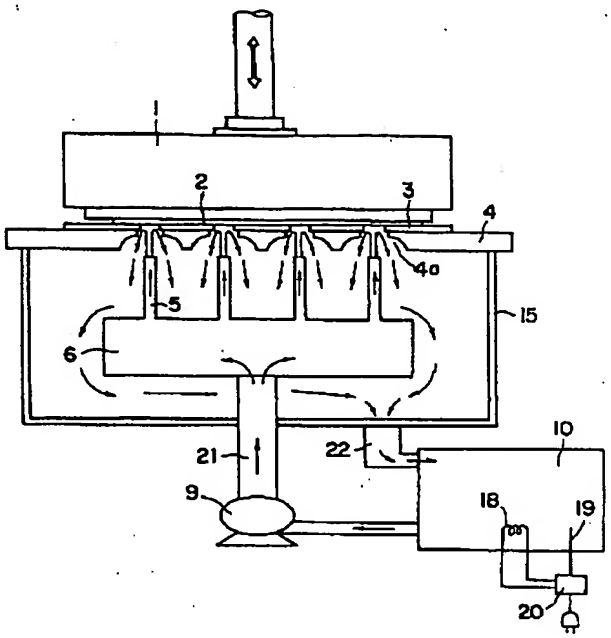
[Translation done.]

Drawing selection drawing 3



[Translation done.]

Drawing selection drawing 4



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EUROPEAN PATENT OFFICE

Patent Abstracts of Japan

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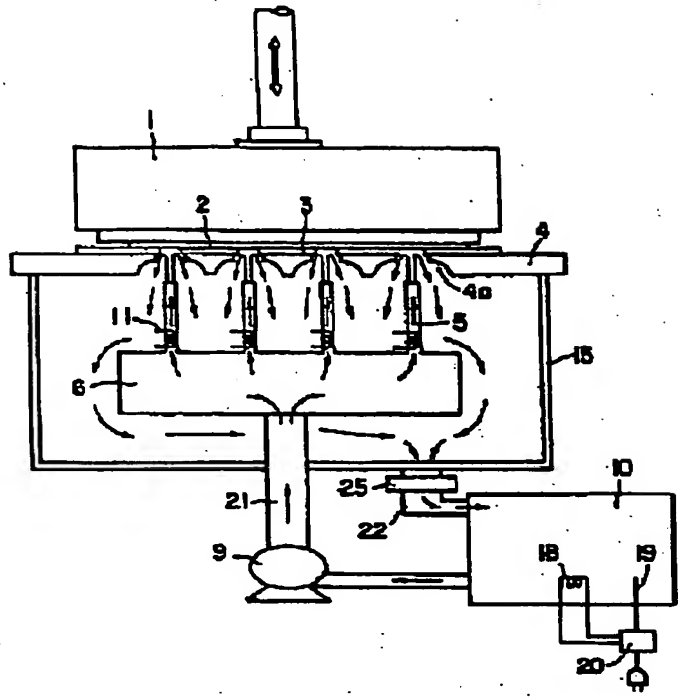
TITLE : PLATING DEVICE FOR LEAD FRAME



ABSTRACT : PURPOSE: To increase a current density and to rapidly plate a lead frame by heating a plating liquid injected from injection nozzles to this lead frame to a high temp.

CONSTITUTION: A lead frame 2 is held between a jig 4 for a mask having through-holes 4a and a press block 1. The plating liquid in a plating liquid tank 10 is introduced by a supply line 21 to injection nozzles 5 and is heated by the heaters 11 of the injection nozzles 5. The heated plating liquid is injected from the through-holes 4a of the jig 4 for mask to the lead frame 2. The plating liquid injected to the lead frame 2 is thereafter returned from the bottom of a sparger 15 through a return line 22 to the plating liquid tank 10.

でリードフレーム２を挟持するプレスブロック１とを備えており、マスク用治具４の上面にはマスクゴム３が取付けられている。

【００１５】マスク用治具４は、外槽１５の上端開口に設置され、この外槽１５内には、噴射ノズル５が取付けられた噴射タンク６が配設されている。

【００１６】また外槽１５の外方には、めっき液を貯えるめっき液タンク１０が配設され、このめっき液タンク１０と噴射タンク６とは、圧送ポンプ９が取付けられた供給ライン２１によって連結されている。さらに外槽１５の底部とめっき液タンク１０とは、戻りライン２２によって連結されている。

【００１７】また、めっき液タンク１０内には、ヒータ１８および熱電対１９が内蔵され、熱電対１９からの信号に基づいて温調器２０がヒータ１８の入切を行い、めっき液タンク１０内の温度を約３０°～５０℃に維持している。

【００１８】また、図１に示すように、各噴射ノズル５の噴射タンク６側基端部には、噴射タンク６から噴射ノズル５側へ送られるめっき液を更に加熱して、めっき液温度を７０℃～９０℃とするヒータ１１が取付けられている。さらにスパージャー外槽１５からめっき液タンク１０までの戻りライン２２には、戻りライン２２内のめっき液を例えば３０℃～５０℃まで冷却するための冷却装置２５が設けられている。なお、ヒータ１１を噴射ノズル５の上流側近傍、例えば噴射タンク６に設けてもよい。

【００１９】次に各部の材質について説明する。外槽１５、噴射タンク６および噴射ノズル５は、ガラスエポキシ樹脂またはセラミックからなり、まためっきタンク１０、供給ライン２１および戻りライン２２は耐熱塩ビまたは通常の塩ビからなっている。

【００２０】次にこのような構成からなる本実施例の作用について説明する。図１においてマスク用治具４のマスクゴム３上にリードフレーム２が載置され、このリードフレーム２に対してプレスブロック１が降下し、マスク用治具４とプレスブロック１との間でリードフレーム２が挟持される。次に、めっき液タンク１０内に３０℃～５０℃の温度で貯えられためっき液が、圧送ポンプ９によって供給ライン２１を経て噴射タンク６に供給される。めっき液は、更に噴射タンク６から噴射ノズル５を経て、マスク用治具４の透孔４ａからリードフレーム２に対して噴射される。この場合、めっき液はヒータ１１によって７０℃～９０℃まで加熱され、同時にリードフレーム２に対してリードフレーム２を陰極として通電が行われる。

【００２１】このようにリードフレーム２に対して通電することにより、リードフレーム２に対してめっきが施される。この場合、噴射ノズル５から噴射されるめっき液の温度を７０℃～９０℃まで加熱することができるので、めっき液の電流密度を高め、リードフレーム２に対して同一厚さのめっきをより短時間で施すことができる。

【００２２】リードフレーム２に噴射されためっき液は、その後、外槽１５の底部まで自重で降下し、めっき液は外槽１５の底部から戻りライン２２を経てめっき液タンク１０内に戻る。この間めっき液は、戻りライン２２の冷却装置２５によって３０℃～５０℃まで冷却される。このように冷却装置２５によって冷却されためっき液がめっき液タンク１０内に戻されるので、めっき液タンク１０内において、めっき液の温度を３０℃～５０℃に保つことができる。

【００２３】以上のように本実施例によれば、ヒータ１１によって７０℃～９０℃まで高温に加熱したためっき液を、噴射ノズル５からリードフレーム２に対して噴射することができるとともに、リードフレーム２からのめっき液を冷却装置２５によって冷却してめっき液タンク１０内に戻すことができる。このためリードフレーム２に対して噴射されるめっき液の電流密度を高め、リードフレーム２に対して同一厚さのめっきをより短時間に施すことができる。またためっき液タンク１０内において、めっき液を３０℃～５０℃に維持して貯えることができるので、特にめっき液タンク１０、供給ライン２１および戻りライン２２を耐熱性材料で作製する必要はない。

【００２４】次に、図２により、本発明の第２の実施例について説明する。図２に示すように第２の実施例は外槽を設ける代わりに、マスク用治具４に各噴射ノズル５を覆う囲い部７を設けるとともに、戻りライン２２に真空ポンプ１８を設けたものであり、他は図１に示す第１の実施例と略同一である。

【００２５】すなわち、図２に示すように、マスク用治具４の下部に、各噴射ノズル５を覆う囲い部７が設けられ、この囲い部７は噴射タンク６に支持された連通体７ａに連通している。また連通体７ａは戻りライン２２を介してめっき液タンク１０に接続され、さらに戻りライン２２には真空ポンプ（吸引ポンプ）１８が取付けられている。

【００２６】次にこのような構成からなる本実施例の作用について説明する。図２に示すように、めっき液タンク１０内で３０℃～５０℃に保たれためっき液は、圧送ポンプ９によって噴射タンク６まで達し、ヒータ１１によって７０℃～９０℃まで加熱された後、噴射ノズル５を経てリードフレーム２に対して噴射される。リードフレーム２に噴射されためっき液は、その後囲い部７内を通って連通体７ａに達し、その後、戻りライン２２を通ってめっき液タンク１０へ戻される。この間、戻りライン２２において、めっき液は冷却装置２５によって３０℃～５０℃まで冷却され、真空ポンプ１８によって吸引されてめっき液タンク１０へ戻される。

【００２７】めっき液を高温化した場合、よりめっきが

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つきやすくなるため、治具からめっき液が漏れた場合、その部分にめっきがつき易くなるが、本実施例によれば、噴射ノズル5からリードフレーム2に対して噴射しためっき液を、真空ポンプ18により囲い部7および連通体7aを経て吸い出すことにより、治具内部が負圧となるため、めっき液が外に漏れにくく、よって、めっきすべき部分以外にめっきがついてしまうことを起こしにくい。また、めっき液を強制的に吸い出すことにより、リードフレームのめっきすべき部分でのめっき液の流れが早くなり、めっき液高温化との相乗効果でよりめっきの高速化を図ることができる。

【0028】次に図3により、本発明の第3の実施例について説明する。図3に示すように、第3の実施例は真空ポンプを設ける代わりに、戻りライン22にアスピレータ26を設けたものであり、他は図2に示す第2の実施例と略同一である。

【0029】すなわち、図3に示すように、連通体7aに戻りライン22が接続され、この戻りライン22の先端にアスピレータ26が設けられている。また、めっき液タンク10には、圧送ポンプ27が取付けられた循環ライン28が接続されている。この循環ライン28は、めっき液タンク10からアスピレータ26まで延び、さらに循環ライン28はめっき液タンク10に接続されている。

【0030】次にこのような構成からなる本実施例の作用について説明する。図3に示すように、めっき液タンク10内で30℃～50℃に保たれたためっき液は、圧送ポンプ9によって噴射タンク6まで達し、ヒータ11によって70℃～90℃まで加熱された後、噴射ノズル5を経てリードフレーム2に対して噴射される。

【0031】リードフレーム2に噴射されためっき液は、その後囲い部7内を通って連通体7aに達し、その後戻りライン22を通ってめっき液タンク10へ戻される。この間、圧送ポンプ27によってめっき液タンク10内のめっき液が、循環ライン28中を循環する。そして圧送ポンプ27からの比較的低温のめっき液がアスピレータ26内を通過すると、このアスピレータ26によって連通体7a内の比較的高温のめっき液が吸い出され、アスピレータ26において圧送ポンプ27からの比較的低温のめっき液と連通体7aからの比較的高温のめっき液が混合される。このように、アスピレータ26は連通体7aからのめっき液の吸引と、連通体7aからのめっき液の冷却の2つの機能を果す。

【0032】

【発明の効果】以上説明したように、本発明によれば、めっき液を噴射ノズルで加熱した後、マスク用治具の透孔を経てリードフレームに対して噴射することができるので、リードフレームに噴射されるめっき液を高温として電流密度を高め、リードフレームに対してより短時間でめっきを施すことができる。また噴射ノズルまでめっき液を比較的低温で供給することができるので、めっき液タンクおよび供給ラインを耐熱材料で作製する必要がなくなる。

【図面の簡単な説明】

【図1】本発明によるリードフレームのめっき装置の第1の実施例を示す説明図。

【図2】本発明によるリードフレームのめっき装置の第2の実施例を示す説明図。

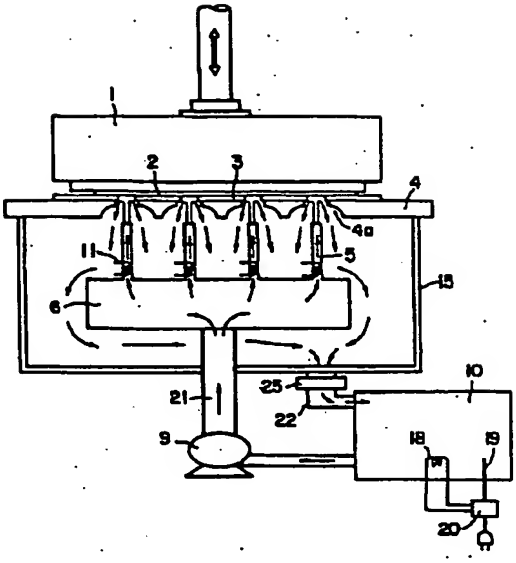
【図3】本発明によるリードフレームのめっき装置の第3の実施例を示す説明図。

【図4】従来のリードフレームのめっき装置を示す図。

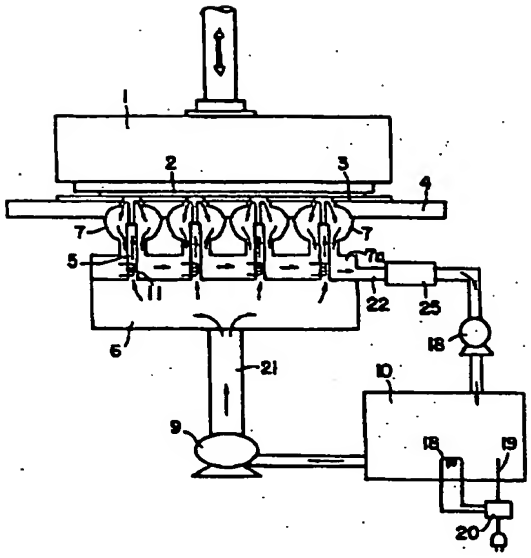
【符号の説明】

1　プレスブロック
2　リードフレーム
4　マスク用治具
5　噴射ノズル
6　噴射タンク
7　囲い部
7a　連通体
9　圧送ポンプ
10　めっき液タンク
11　ヒータ
15　外槽
21　供給ライン
22　戻りライン
25　冷却装置

【図1】


2
3
4
4a
11
5
15
6
21
25
22
10
9
18
19
20

【図2】


2
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4
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7a
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25
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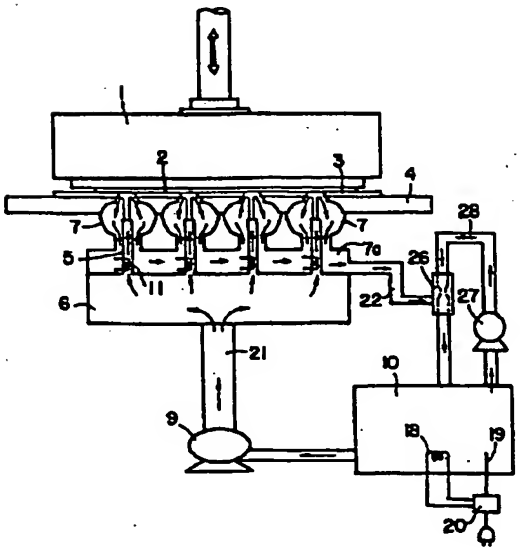
【図3】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28
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7
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7a
26
11
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27
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19
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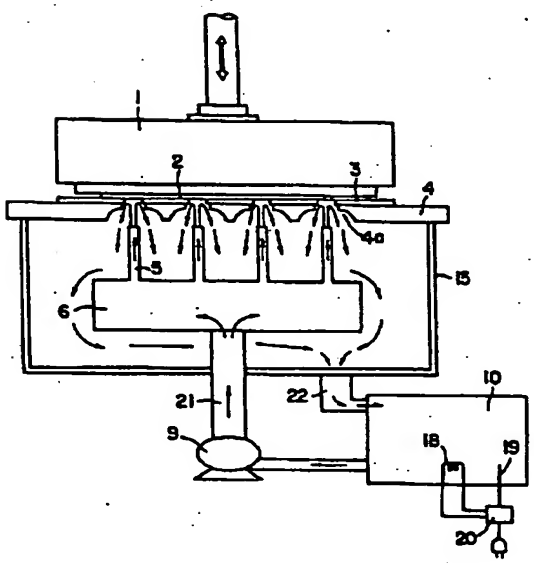
【図4】


2
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